THE MINERAL RESOURCES OF THE FRENCH COLONIES.

Les Produits Coloniaux d'Origine Minérale. By Prof. Laurent. Pp. viii + 352. (Paris: Baillière, 1903.) Price 5 francs.

THIS little work forms one volume of the "Colonial Library," which is a small series of four-shilling books dealing with the animal, vegetable, and mineral products of the French colonies, as well as with the question of hygiene. It is divided into two chapters; the first briefly describes the geology of each colony and enumerates its various mineral products; in the second, each useful mineral is taken in its turn, and the sources of supply in each colony are discussed.

The book would have been improved by a summary, giving at a glance a general idea of the mineral wealth of the French possessions. This I have endeavoured to supply so far as official information is available.

Mineral Output of the French Colonies and Protectorates, 1901.

Mineral	Algeria		French Guiana		Indo-China		Madagascar		New Caledonia		Tunis		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Metric Tons.	£	Kilos.	£	Metric Tons	£	Kilos.	£	Metric Tons	£	Metric Tons	£	Metric Tons	£
Brown Coal ...	213	102	—	—	—	—	—	—	—	—	—	—	213	102
Coal ...	—	—	—	—	248,622	12,431[1]	—	—	—	—	—	—	248,622	12,431[1]
Chrome Ore ...	—	—	—	—	—	—	—	—	17,451	37,840	—	—	17,451	37,840
Clay ...	119,195	17,040	—	—	—	—	—	—	—	—	—	—	119,195	17,040
Cobalt Ore ...	—	—	—	—	—	—	—	—	3,123	16,600	—	—	3,123	16,600
Copper Ore ...	7,267	5,035	—	—	—	—	—	—	1,088	3,960	—	—	8,355	8,995
Flags ...	8,350	3,424	—	—	—	—	—	—	—	—	—	—	8,350	3,424
Gold ...	—	—	4,021	434,320	—	—	1,045	112,860	—	—	—	—	kils 5,066	547,180
Gypsum...	600	60	—	—	—	—	—	—	—	—	—	—	600	60
Iron Ore ...	514,473	198,679	—	—	—	—	—	—	—	—	—	—	514,473	198,679
Lead Ore ...	1,614	4,383	—	—	—	—	—	—	—	—	8,200	26,760	9,814	31,143
Limestone ...	27,000	25,500	—	—	—	—	—	—	—	—	34,800	29,635	61,800	55,135
Nickel Ore ...	—	—	—	—	—	—	—	—	132,814	297,400	—	—	132,814	297,400
Onyx	294	3,352	—	—	—	—	—	—	—	—	—	—	294	3,352
Phosphate of Lime	265,000	212,000	—	—	—	—	—	—	—	—	172,375	105,700	437,375	317,700
Plaster	34,740	26,397	—	—	—	—	—	—	—	—	12,984	24,078	47,724	50,475
Potter's Clay ...	—	—	—	—	—	—	—	—	—	—	6,375	300	6,375	300
Salt ... ,,	18,518	15,995	—	—	2,502	4,050	—	—	—	—	16,900	14,880	37,920	34,925
Sand and Gravel	86,727	3,774	—	—	—	—	—	—	—	—	—	—	86,727	3,774
Stone, Building	798,560	73,744	—	—	—	—	—	—	—	—	873,805	61,251	1,672,365	134,995
,, Rough	1,436,250	56,550	—	—	—	—	—	—	—	—	—	—	1,436,250	56,550
Zinc Ore	26,913	52,704	—	—	—	—	—	—	—	—	17,900	43,240	44,813	95,944
Total ...	—	698,739	—	434,320	—	16,481	—	112,860	—	355,800	—	305,844	—	1,924,044

[1] Estimated.

The total value of all the minerals produced by the French colonies is about 2 millions sterling, of which Algeria claims more than one-third. The mineral wealth of this colony is derived mainly from its iron ore and phosphate of lime; French Guiana is the largest gold producer; New Caledonia is famous for its nickel ore; and Tunisia is coming into notice on account of its phosphatic deposits.

The growing importance of the phosphate industry of northern Africa is worthy of notice, indeed, this mineral comes second in order of value in the table. The author gives some interesting details concerning the phosphatic beds at Gafsa, from which nearly all the phosphate of Tunisia is obtained. The mineral was not discovered at Gafsa until 1885, and the concession for working it was not obtained until 1896. Since that date the French have constructed a railway 156 miles long, from the port of Sfax to the centre of the mining district, and it is expected that the output for 1903 will be about 300,000 tons. The phosphatic beds occur in rocks of Lower Eocene age; the principal seam now being worked at Gafsa is 11 ft. 6 ins. thick, and contains 60 per cent. of tribasic phosphate of lime.

In spite of being full of valuable information, Prof. Laurent's book is unsatisfactory, because he has introduced much matter which is entirely out of place under the title chosen for the volume. But in his preface he tells us that the book is a *résumé* of his lectures to young men who propose to go to the colonies, and that he wishes them to know something of the modes of occurrence and methods of treatment of minerals in other countries, so that they may be able to take advantage of the possible resources of new districts. He consequently enters into details which make parts of the book into a jumble of geology, mineralogy, prospecting, mining, quarrying, dressing, smelting, saltmaking, &c. There is no royal road to learning, and the attempt to teach in one course of lectures what in reality requires at least four separate courses should certainly be discouraged. And there are other grounds for complaint; the figure of a sulphur-still is very antiquated, and, if my memory serves me aright, it appeared in my French lesson books half a century ago. I doubt very much whether this old form is ever used now; at all events, it is very different from the "doppioni" which were employed for treating the sulphur rock in the Romagna in the early 'seventies. The picture of the modern kiln does not give the proportions of an ordinary Sicilian "calcarone." Other second-hand figures have been picked up and inserted here and there with little advantage to the reader. Nothing could well be worse than the figure of a blast-furnace, and a student unacquainted with Blake's stone-breaker would fail to understand its action by

reference to the illustration. It is true this is well lettered, but no explanation is furnished as to what each letter denotes. Many of the figures prepared specially for the book from photographs are of little use.

In a word, the book would have been more acceptable if the author had confined his attention to the matters really included in the title, and had supplied better illustrations.

EXPERIMENTAL SCIENCE FOR BEGINNERS.

Practical Chemistry. By Walter Harris, M.A., Ph.D. Vol. i. Measurement. Vol. ii. Exercises and Problems. Vol. iii. Qualitative and Quantitative Analysis. Pp. x+91; ix+172; vii+146. (London: Whittaker and Co., 1903.)

THERE are probably few teachers, who, with half-a-dozen pupils and plenty of time to devote to them, would not prefer the oral to the book process of imparting the elements of experimental science. Yet when the number in a class is large, and laboratory work is limited to one or two hours a week—the usual order of things in schools—the demonstrator must be relieved by the aid of some form of printed instructions.

In compiling a book of this kind, the chief difficulty which presents itself is to know how much to tell about the processes, and how much to leave to the pupil's intelligence and initiative.

Given the budding philosopher and plenty of time, very little book direction is necessary, and he may safely be left to worry out details for himself. The everyday youth is not a philosopher, and if, in addition, he has only one hour a week in the laboratory, he must be helped to his results in a very substantial manner, to enable him not only to absorb a variety of facts in the time at his disposal, but (and this is equally important) to avoid the discouraging consequences of repeated experimental failures. These points have been recognised in the three little volumes which together make up Dr. Harris's "Practical Chemistry." Vol. i. deals really with elementary physics, and contains exercises in measurement of length and volume, mass and density. Vol. ii. contains easy qualitative and quantitative experiments in chemistry. The third volume contains the elements of qualitative and quantitative analysis, in reference to which the author laconically remarks that "for those who do not require this section for examination purposes, it should be omitted." The experiments in the first two volumes are numerous, simple, and suggestive, and well adapted for a school laboratory, and there are many things which will be found of value to the teacher as well as to the student.

One feels compelled to differ from the author on the subject of illustrations. The author says: "The omission of all illustrations of apparatus is a new departure." Is it a good one? We must remember that the beginner does not recognise by name even "the permanent apparatus commonly seen in laboratories," and although it is very desirable that "the student should be encouraged to devise his own apparatus," it is a process which is certain to result in failure and loss of time. Those who have attempted with all the knowledge of laboratory resources to reduce an apparatus to a simple form, will recognise how troublesome the process is. Moreover, the author gives no directions for working glass; which, one would suppose, would be the first step in fitting up glass apparatus.

May one further suggestion be offered? Experiment 1, in section ii., on homogeneous and heterogeneous substances, is not a single experiment at all, but a very condensed account of the separation of solids and liquids, in which filtration, sublimation, levigation, and fractional distillation are discussed in turn. This and some other chapters would be improved by dividing them up and by giving, in addition to general principles, a description of specific instances, from which the teacher might make his own selection.

There is no doubt that these volumes will form a useful addition to the modern literature on science teaching. J. B. C.

OUR BOOK SHELF.

Untersuchungen über Amylose und Amyloseartige Körper. By O. Bütschli. (Heidelberg: Carl Winter, 1903.)

THIS pamphlet of about 100 pages is a reprint from the *Proceedings* of the Heidelberg Association for Natural History and Medicine (vol. vii. part iii.), which is one of the best known of the German scientific societies. It illustrates a tendency, not infrequently seen in Germany, to utilise the pages of a journal for the issue of what is practically a book. The author, Prof. Bütschli, is well known to students of biology for his work on protoplasm, and distant as the subject of starch may at first appear from zoological studies, the present research is a direct outcome of the former. The microscopic investigation of various colloids occurring in nature which led Bütschli to his well-known hypothesis of the foam-like structure of protoplasm caused him later to direct his attention to the formation of starch grains, cellulose membranes and the like in the vegetable world. Some years ago he published his view that starch grains are of the nature of sphæro-crystals. From this he passed on to attempt to prepare starch grains artificially from starch solutions, and he was rewarded by the discovery that, under certain conditions, especially on evaporating a solution containing also 5 per cent. of gelatin, particles differing but slightly from natural starch grains are deposited. These results were criticised by Arthur Meyer, who expressed the opinion that these particles consisted not of starch, but of amylodextrin. The present pamphlet is a reply to these criticisms, and on the ground of various chemical reactions the conclusion is finally reached that Meyer was wrong, and the author right in his original contention.

This is the gist of the monograph, and its length is due to the fact that it became necessary for the author to make a chemical investigation of various starches, dextrins, and allied carbohydrates in order to justify his main conclusions.

From the purely chemical standpoint very little real progress is contributed to our knowledge of the carbohydrates. The sugars, thanks to Fischer and others, we now know something about, but concerning the